Patent Claims

1. An arrangement for monitoring electrical equipment for the formation of accidental arcs comprised of at least one electrical conductor (1) formed as a single-wire or multi-wire line or cable, which connects devices, subassemblies or circuit components of the piece of electrical equipment to one another, means which guide the light that emerges when an arc is formed from the site of its formation to an optical/electrical transformer (3) and a monitoring and evaluating unit (4) electrically connected to the transformer (3) for evaluating the signals of transformer (3), is hereby characterized in that the means which guide the light that emerges when an arc is formed to an optical/electrical transformer (3) involve at least one optical fiber (2), which envelops one or more wire cores of the electrical conductor (1) and thus simultaneously forms the electrical insulation of a line or the shielding of a cable.

2. The arrangement according to claim 1, further characterized in that the arrangement responds to an arc, which originates from the electrical conductor (1), whereby the light originating from the arc is coupled to the optical fiber (2) directly on the inside of the optical fiber (2).

3. The arrangement according to claim 1 or 2, further characterized in that the arrangement responds to an arc which arises at a contact site of electrical conductor (1) with other units of the piece of electrical equipment, this site being formed as a clamp or plug connection (5), whereby the optical fiber (2) is guided into the contact site and the light originating from the arc is coupled axially to a front surface (6) of the optical fiber (2).

4. The arrangement according to one of claims 1 to 3, further characterized in that it comprises means for disconnecting the current through the circuit components of the piece of electrical equipment that are affected by the arc, and these means are actuated or activated by the monitoring and evaluating unit (4) based on the detection of the arc.

5. The arrangement according to one of claims 1 to 3, further characterized in that the optical fiber (2) enveloping the one or more wire cores of the electrical conductor (1) is enveloped by an additional electrically insulating cladding (7) that is not transparent to light.

6. The arrangement according to claim 5, further characterized in that the inner surface of the additional outer cladding (7) is structured in an optically reflecting manner, wherein a light-reflecting foil is preferably disposed on its inner side for this purpose.

7. The arrangement according to claim 1 or 5 with an electrical conductor (1) that is uneven on its outer surface, further characterized in that the electrical conductor (1) is provided with a compensating layer that is preferably light-reflecting and is arranged between it and the optical fiber (2) in order to obtain an even surface.

8. The arrangement according to claim 1 or 5, further characterized in that the electrical conductor (1) that is structured as a wire or a cable is enveloped by several optical fibers (2) separated by intermediate layers.

9. The arrangement according to claim 1 or 5, further characterized in that the combination conductor formed by the enveloping of the electrical conductor (1) with the optical fiber (2) is formed as a line that can be trimmed in its length.

10. The arrangement according to claim 1 or 5, further characterized in that the optical fiber (2) functioning simultaneously as insulation or shielding consists of a polymer.

11. The arrangement according to claim 10, further characterized in that the optical fiber (2) consists of polymethyl methacrylate.

12. The arrangement according to claim 10, further characterized in that the optical fiber (2) consists of polymethylpentene.

13. The arrangement according to claim 10, further characterized in that the optical fiber (2) consists of polycarbonate.

14. The arrangement according to claim 1 or 5, further characterized in that filters for

suppressing the effect of extraneous light are disposed on or in the optical/electrical transformer (3).

15. The arrangement according to claim 1 or 5, further characterized in that the optical/electrical transformer (3) is constructed in the form of a cap that can be attached to an axial end of the optical fiber (2) or as a disk that can be pushed open, whereupon the electrical conductor (1) projects through the cap or the disk.

16. The arrangement according to claim 1 or 14, further characterized in that the optical/electrical transformer (3) can be screwed onto an axial end of the optical fiber (2).

17. The arrangement according to claim 1 or 14, further characterized in that the optical/electrical transformer (3) is sealed in the optical fiber (2).

18. The arrangement according to claim 10 or 17, further characterized in that the optical/electrical transformer consists of a polymer.

19. The arrangement according to claim 1 or 5, further characterized in that the optical fibers (2) of several electrical conductors (1) are guided onto an optical/electrical transformer (3).

20. The arrangement according to claim 1 or 19, further characterized in that the optical/electrical transformer (3) is formed as a CCD line, a CCD matrix or a CMOS array.

21. The arrangement according to one of claims 1 to 3, further characterized in that an axial end of an optical fiber (2) that is not sealed off by an optical/electrical transformer (3) is mirror-coated or is provided with a reflecting cap.

22. The arrangement according to claim 21, further characterized in that an optical emitter is disposed in the reflecting cap for conducting a self-test of the arrangement, wherein the cap is formed as a semi-transparent mirror, which is transparent to light emitted from the optical transmitter disposed in the cap.

23. The arrangement according to one of claims 1 to 3, further characterized in that light intensifiers are disposed in segments in optical fibers (2) with long line lengths.

24. The arrangement according to one of claims 1 to 3, further characterized in that the optical fiber (2) enveloping the electrical conductor (1) serves both for the coupling of the light of a possible arc as well as for the transmission of other useful signals within the monitored piece of electrical equipment.

25. The arrangement according to claim 24, further characterized in that the light signals caused by accidental arcs and useful optical signals are differentiated with the help of reference curves filed in the monitoring and evaluating unit (4) for different types of accidental arcs.

26. The arrangement according to claim 1 or 24, further characterized in that the optical/electrical transformer (3) and light-emitting components present in the case of using optical fiber (2) for the transmission of useful signals are coupled by means of a slot/clamping technique for coupling and uncoupling light from the outside to the wave guide (2), wherein they are impressed into the wave guide (2) by a claw-like formation with projecting optically active elements.

27. The arrangement according to one of claims 1 to 3, further characterized in that information is exchanged between optical/electrical transformer (3) and monitoring and evaluating unit (4) via an electrical conductor (1) enveloped by an optical fiber (2).

28. The arrangement according to claim 27, further characterized in that information is exchanged between optical/electrical transformer (3) and monitoring and evaluating unit (4) via a power line serving simultaneously for the power supply of the monitored piece of electrical equipment.